

Supplementary materials

Table S1 The qPCR Primer Sequences

Gene	Primer	Sequences (5'-3')
<i>Homo sapiens</i>		
<i>IL-1α</i>	Forward	TGTATGTGACTGCCCAAGATGAAG
	Reverse	AGAGGAGGTTGGTCTCACTACC
<i>IL-1β</i>	Forward	CCACAGACCTTCCAGGAGAATG
	Reverse	GTGCAGTTCAGTGATCGTACAGG
<i>IL-4</i>	Forward	CCGTAACAGACATCTTTGCTGCC
	Reverse	GAGTGTCTTCTCATGGTGGCT
<i>IL-6</i>	Forward	AGACAGCCACTCACCTCTTCAG
	Reverse	TTCTGCCAGTGCCTCTTTGCTG
<i>IL-8</i>	Forward	GAGAGTGATTGAGAGTGGACCAC
	Reverse	CACAACCCTCTGCACCCAGTTT
<i>IL-10</i>	Forward	TCTCCGAGATGCCTTCAGCAGA
	Reverse	TCAGACAAGGCTTGGAACCCA
<i>TNFα</i>	Forward	CTCTTCTGCCTGCTGCACTTTG
	Reverse	ATGGGCTACAGGCTTGCTACTC
<i>CCL5</i>	Forward	TACACCAGTGGCAAGTGCTC
	Reverse	TGTACTCCCGAACCCATTTC
<i>SDF1</i>	Forward	CTCAAACTCCAACTGTGCCC
	Reverse	CTCCAGGTACTCCTGAATCCAC
<i>iNOS</i>	Forward	GCTCTACACCTCCAATGTGACC
	Reverse	CTGCCGAGATTGAGCCTCATG
<i>CXCR4</i>	Forward	CTCCTCTTTGTCATCACGCTTCC
	Reverse	GGATGAGGACACTGCTGTAGAG
<i>GAPDH</i>	Forward	GTCTCCTCTGACTTCAACAGCG
	Reverse	ACCACCCTGTTGCTGTAGCCAA
<i>miR-126</i>	Forward	GCGTCGTACCGTGAGTAAT
	Reverse	GCAGGGTCCGAGGTATTC
<i>miR-130a</i>	Forward	CACATTGTGCTACTGTCT
	Reverse	GAACATGTCTGCGTATCTC
<i>miR-142-3p</i>	Forward	GGGGGTGTAGTGTTCCTA
	Reverse	CAGTGCCTGTCGTGGA
<i>miR-146a</i>	Forward	GAGAACTGAATTCCATGG
	Reverse	GAACATGTCTGCGTATCTC
<i>miR-155</i>	Forward	TGCTAATCGTGATAGGGG
	Reverse	GAACATGTCTGCGTATCTC
<i>miR-223</i>	Forward	CGTGTATTTGACAAGCTG
	Reverse	GAACATGTCTGCGTATCTC
<i>U6</i>	Forward	CTCGCTTCGGCAGCACA
	Reverse	TTTGCCTGTCATCCTTGCG
<i>Rattus norvegicus</i>		
<i>IL-1α</i>	Forward	CGCTTGAGTCGGCAAAGAAA
	Reverse	AGACAGATGGTCAATGGCAGA
<i>IL-4</i>	Forward	CAAGTCTGGGGTTCTCGGTG
	Reverse	AGACCGCTGACACCTCTACA
<i>IL-6</i>	Forward	GTCAACTCCATCTGCCCTTCA
	Reverse	GAAGGCAACTGGCTGGAAGT
<i>IL-10</i>	Forward	ACTTCGATCCTAAGGCTGGC
	Reverse	GCAAGCGAAAGGACACCATT
<i>TNFα</i>	Forward	GGAGGGAGAACAGCAACTCC
	Reverse	GCCAGTGTATGAGAGGGACG
<i>GAPDH</i>	Forward	GCAAGTTCAACGGCACAG
	Reverse	GCCAGTAGACTCCACGACAT

Figure S1:

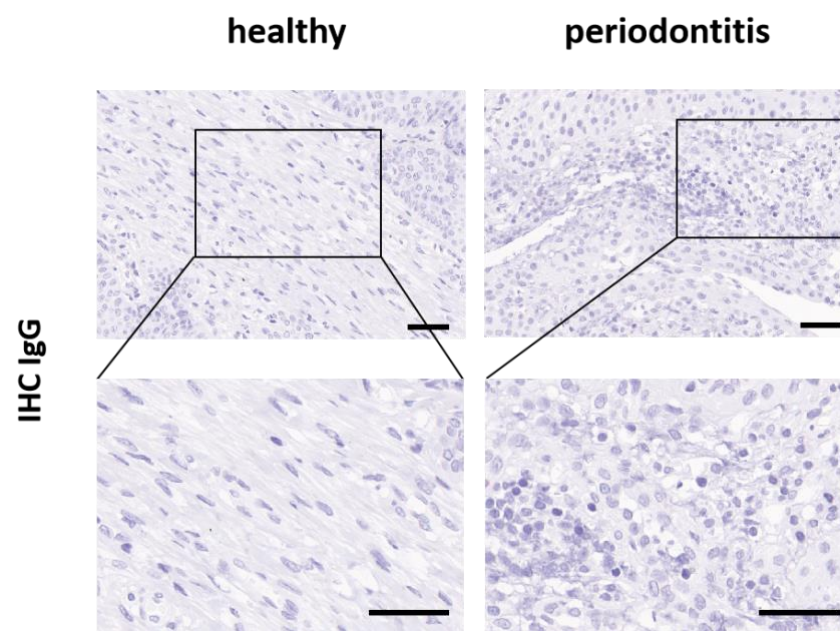


Figure S1 Representative immunohistochemical staining images of IgG as a negative control in two groups. Scale bar=50 μ m.

Figure S2:

The results showed that there were no significant differences in other periodontitis-related microRNAs between the two groups were detected.

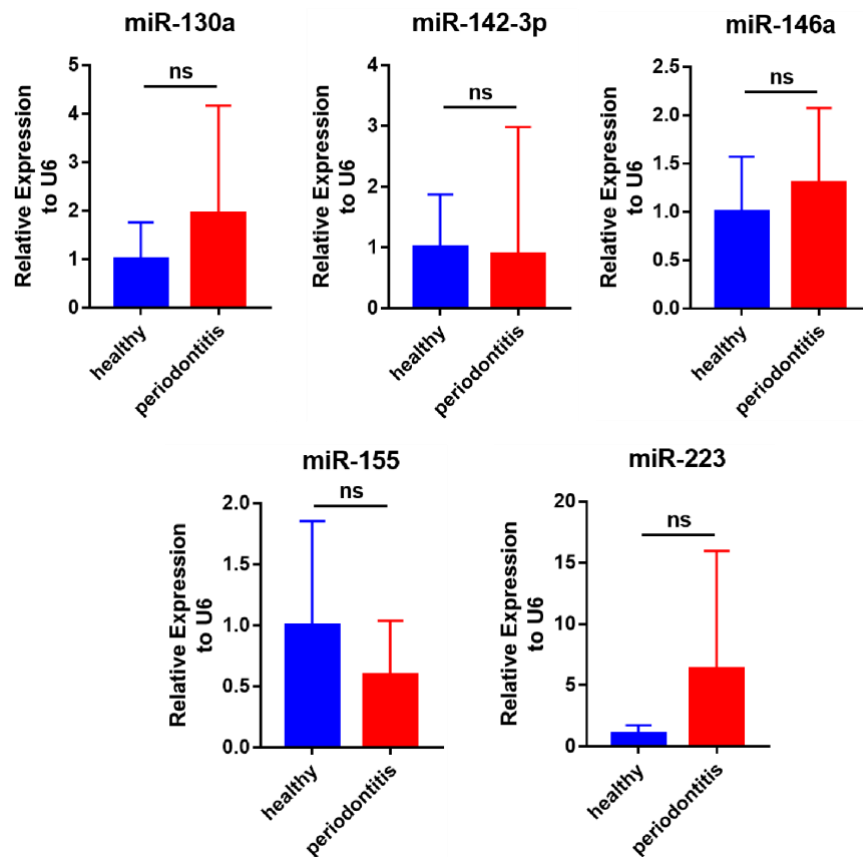


Figure S2 QPCR analysis of miR-130a, miR-142-3p, miR-146a, miR-155 and miR-223 gene expression of the periodontal gingiva from healthy volunteers and periodontitis patients. Data are represented as mean $\pm$ SD.

Figure S3:

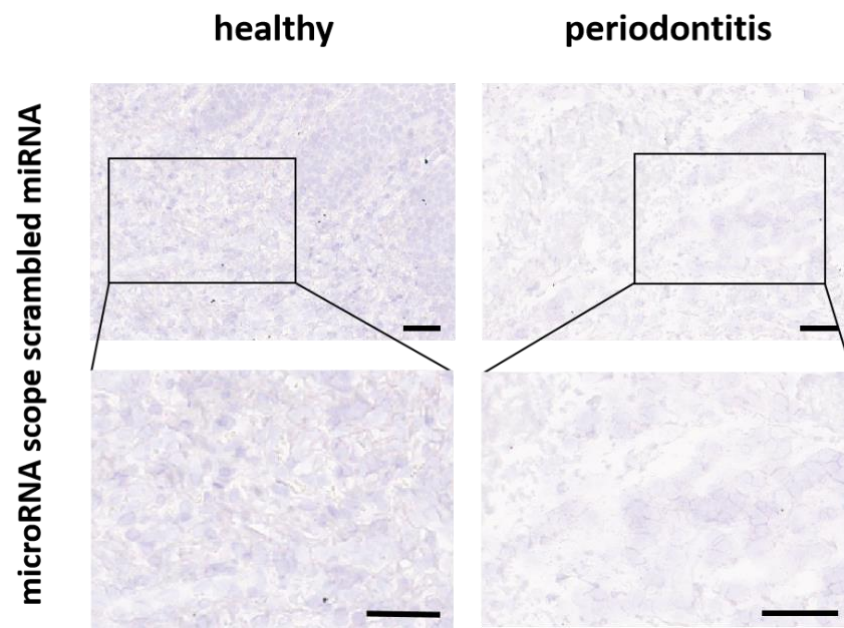


Figure S3 MicroRNA scope staining images of scrambled miRNA as a negative control in periodontium from two groups are shown. Scale bar=50 μ m.

Figure S4:

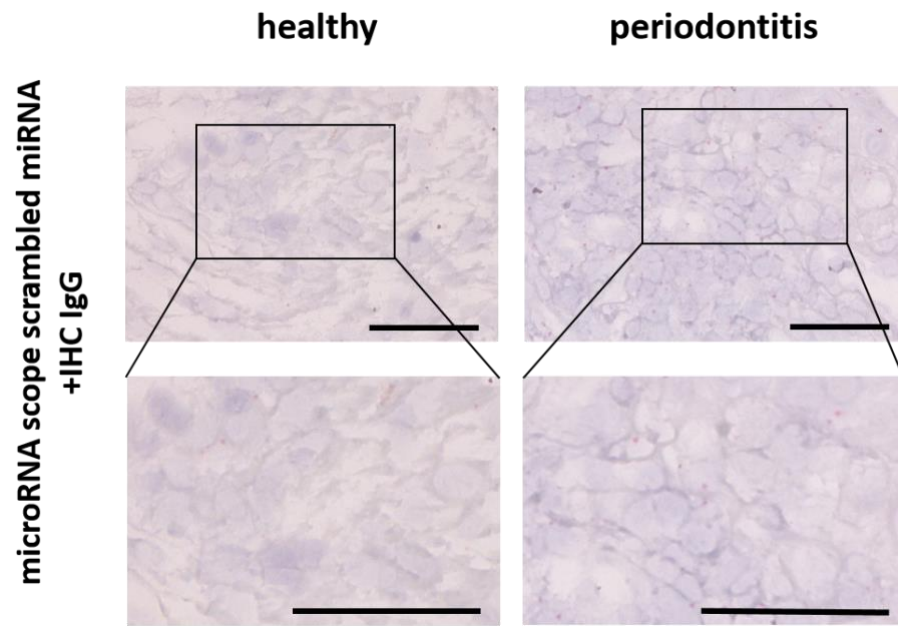


Figure S4 MicroRNA scope staining of scrambled miRNA and IHC staining of IgG as the negative control from two groups are shown. Scale bar=50 μ m.

Figure S5:

The results showed that there was no significant difference in the uptake of CXCR4-Exo and Ctrl-Exo by HBMSC, HGEC and HUVEC.

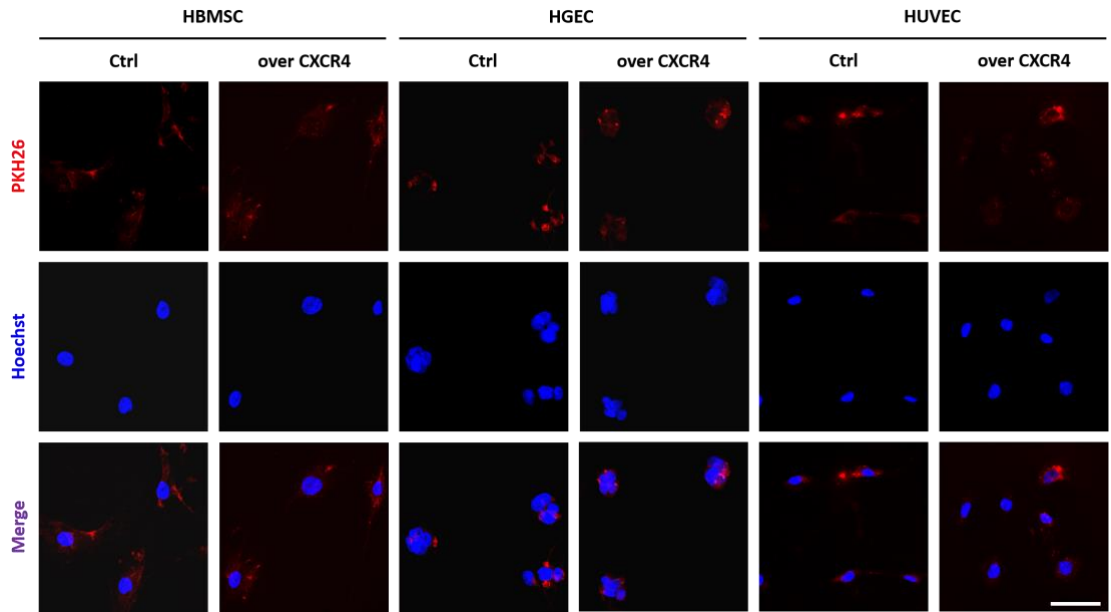


Figure S5 Representative IF images of exosome internalization from HBMSC, HGEC and HUVEC co-cultured with CXCR4-Exo and Ctrl-Exo. Nuclei were stained with Hoechst. Scale bar = 50 μ m.

Figure S6:

Here showed the 3D reconstruction images of the maxillary second molar and alveolar bone of rats in four groups except Figure 6B.

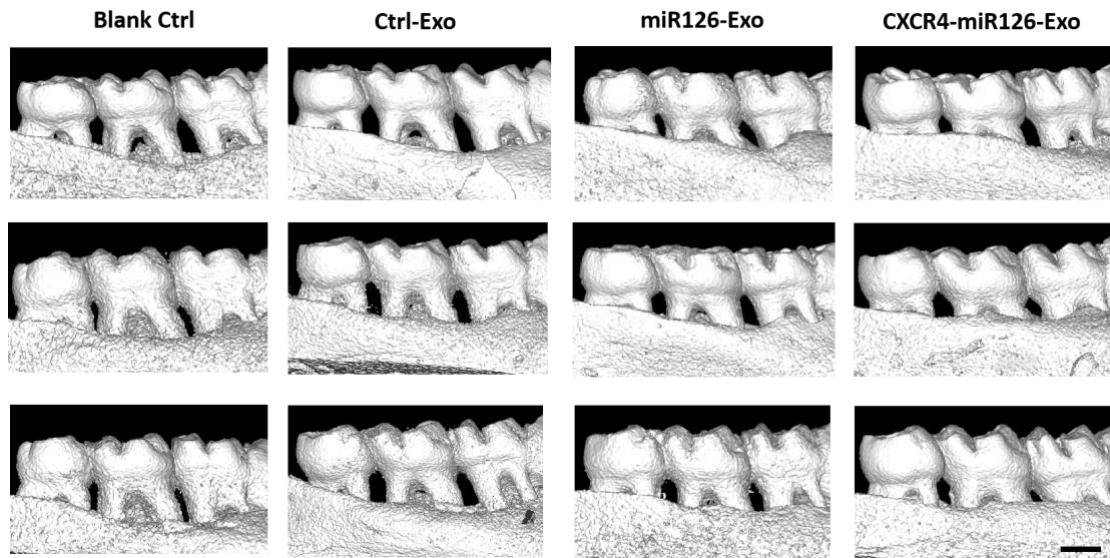


Figure S6 Representative images of a 3D reconstruction of the maxillary second molar and alveolar bone of the Blank Ctrl group, the Ctrl-Exo group, the miR126-Exo group and the CXCR4-miR126-Exo group. Scale bar=1mm.

Figure S7:

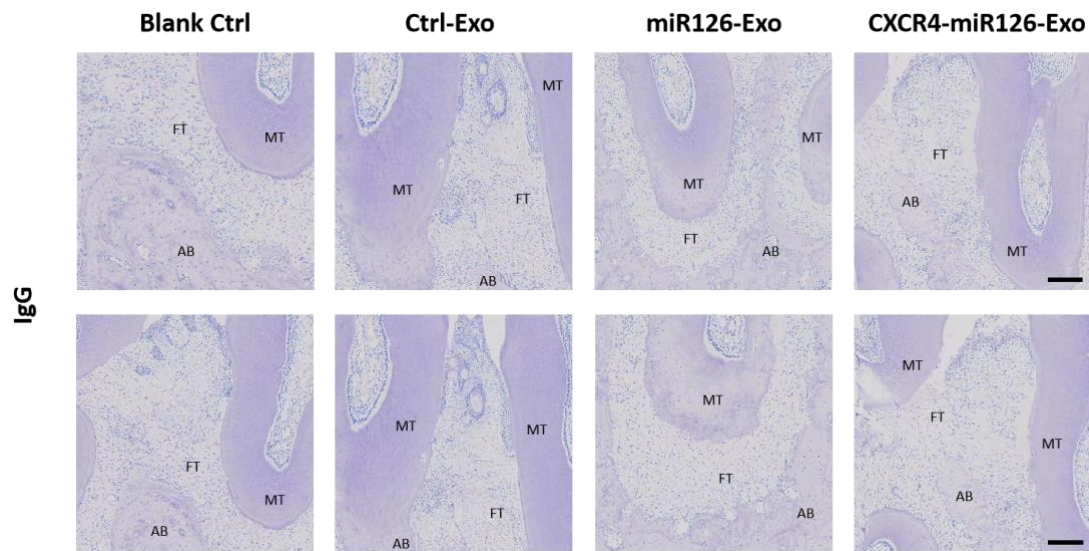


Figure S7 Representative immunohistochemical staining images of IgG as a negative control in each group. Scale bar=200 μ m. AB: alveolar bone; FT: fibrous tissues; MT: molar tissues.

Figure S8:

The expression of CD80 and CD86 in M0 and M1 macrophages were analyzed using the Cytoflex Flow Cytometry (Beckman Coulter, USA) and the CytExpert software (Beckman Coulter, USA). The cells were blocked with 3 μ L Human TruStain FcX (Fc receptor Blocking Solution, BioLegend, USA) for 10 min at room temperature, and stained with 3 μ L APC anti-human CD80 antibody (BioLegend, USA) and 3 μ L PE anti-human CD86 antibody (BioLegend, USA) in the dark for 30 min at 4°C.

Flow cytometry data showed that the M0 macrophages exhibited low expression levels of CD80 and CD86, with double-positive cells accounting for 15.16%, while the M1 macrophages exhibited high expression levels of CD80 and CD86, with double-positive cells accounting for 83.55%.

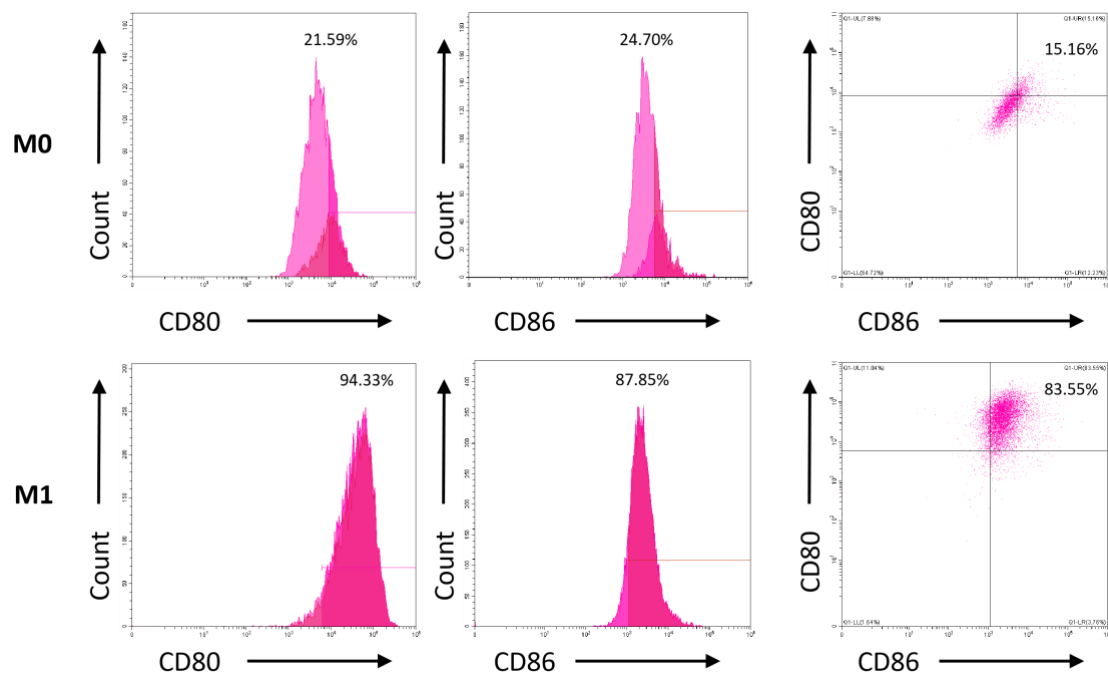


Figure S8 Flow cytometry analysis of CD80 and CD86 expression on M0 and M1 macrophages.

Figure S9:

It was observed by the DsRed fluorescence that miR-126 had high transfection efficiency in the CXCR4-overexpressing 293T/17 cells.

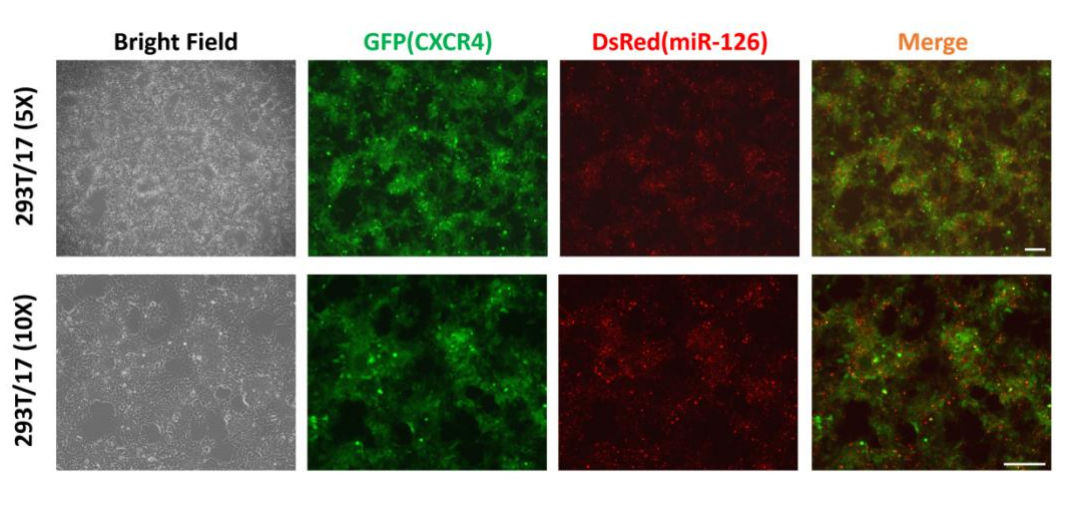


Figure S9 Transfection efficiency of miR-126 in the CXCR4-overexpressing 293T/17 cells. Scale bar=200 μ m.

Figure S10:

The GFP fluorescence revealed that both over-CXCR4 group and negative control group had high transfection efficiency in the 293T/17 cells.

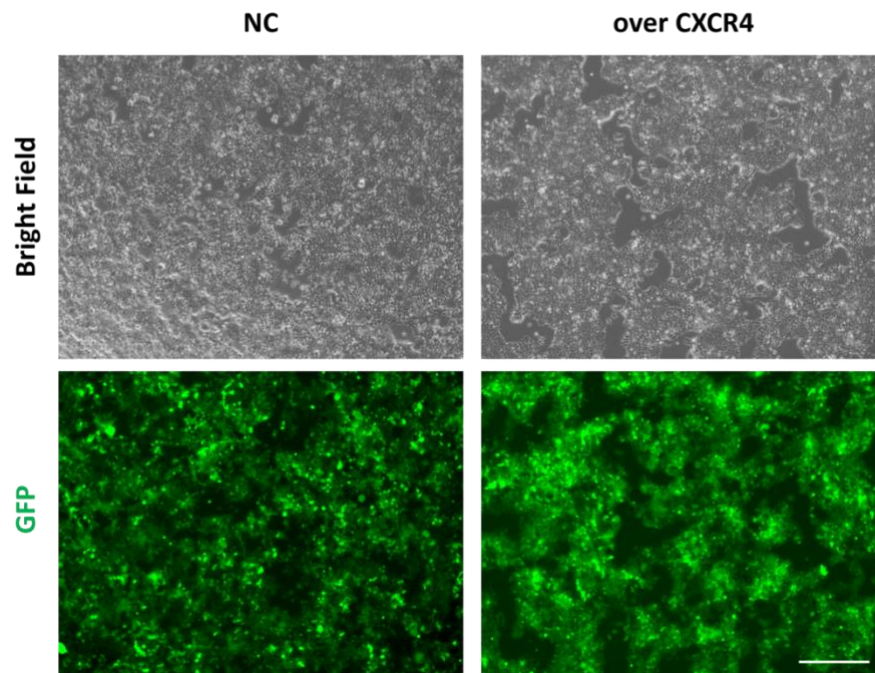


Figure S10 Transfection efficiency of CXCR4 in the 293T/17 cells. Scale bar=500 μ m.

Figure S11:

The results showed the successful construction of the periodontitis rat model. (A) The microCT analysis indicated the significant alveolar bone resorption in the maxillary second molars of the periodontitis rats. (B) Compared with the healthy control group, obvious ulceration of the gingival epithelium of the periodontitis group was observed in the H&E staining. (C) The immunohistochemical staining of CD68 showed only a small number of positive cells were found in the healthy control group, while a large number of positive cells were presented in the periodontitis group.

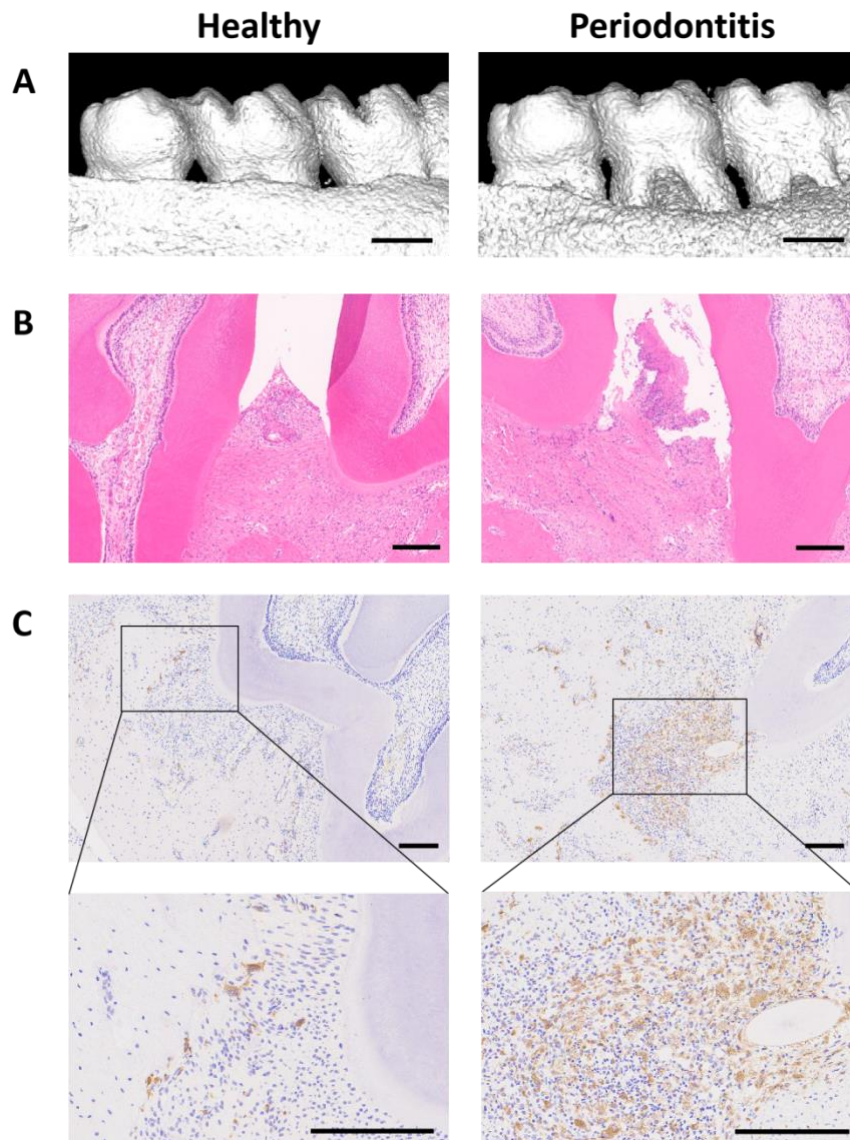


Figure S11 (A) Representative images of 3D reconstruction of the maxillary second molars and alveolar bone of the healthy control group and the periodontitis group. Scale bar=1mm. (B) The H&E staining of the periodontium in two groups. Scale bar=200μm. (C) Representative immunohistochemical staining images of CD68 in two groups. Scale bar=200μm.